



# Alfa Laval LeviMag®

## Mixers

### Introduction

The Alfa Laval LeviMag® is an aseptic magnetic mixer that uses a patented levitating impeller and advanced design to mix down to the last drop and maximize product yield.

Compact, energy-efficient and easy to maintain, it provides dry-running capabilities and efficient mixing at low speeds, which ensures gentle product treatment, as well as at high speeds for high-intensity mixing. This provides greater process flexibility to handle a wide range of fluid types and mixing duties.

Its open design and low-speed rotation during cleaning contribute to effective residue removal and minimize contamination risks from wear particles. All this contributes to fast return on investment and maximum product yield in tanks ranging in size between 30 litres and 40,000 litres.

It is supplied with Alfa Laval Q-doc, a comprehensive documentation package that provides full transparency of the entire supply chain.

### Applications

Alfa Laval LeviMag magnetic mixer offers effective mixing for multiple processes in the dairy, food, beverage, biotechnology, pharmaceutical and other industries that have demanding requirements for sterile or aseptic storage or processing.

### Benefits

- Maximum process efficiency, minimal product loss
- Optimal flow with higher efficiency and less energy consumption
- Mixing down to the last drop for maximum yield due to low agitation and dry-running capability
- Optimized Cleaning-in-Place (CIP) due to full drainability
- Minimized downtime due to ease of maintenance

### Standard design

The Alfa Laval LeviMag consists of a detachable drive unit, levitating impeller unit with radial blades, seals, ceramic bearings and magnetic coupling, weld plate and connections. It is available in five sizes, with mixing speeds ranging from 10 rpm up to 800 rpm.

### Working principle

An impeller with radial blades installed inside the tank rotates due to the torque from the magnetic coupling. The rotation of the impeller mixes the fluid inside the tank. The unique design of the Alfa Laval magnetic coupling ensures the levitation of the impeller at all times. This enables dry-running and complete drainability of process fluids from the tank possible. This ensures highly efficient mixing down to the last drop and, subsequently, maximum yield. It also enables the free flow of CIP liquid and steam around all parts of the mixer, thereby ensuring thorough cleaning. Impeller levitation also eliminates axial wear.



### Available versions

- Impeller with male/female bearing
- Impeller complete, with drive unit
- ATEX version (Cat. II -/2G Ex h IIC T4 -/Gb)

### Drive unit versions

- Painted (fan ventilated)
- Clean room finish, Sealed Surface Conversion Treatment (smooth, closed, none fan ventilated)
- Extended console for insulated tanks

### Motor efficiency

- IE4 (standard)
- Premium (CUS for US)

### Safety class

- No requirements (IE4, Premium)
- Eex-de IIC T4 (on ATEX version)
- Class I div.I, group D T4

### Accessories:

- Weld plates
- Inspection & Service tools
- Installation tools

## TECHNICAL DATA

|                                |                             |
|--------------------------------|-----------------------------|
| <b>Internals:</b>              |                             |
| Product Wetted Surface finish: | Ra <0.8 µm Mech. Polished   |
| Working pressure:              | -1 to 7 bar(g)              |
| Impeller diameters:            | 100, 150, 200, 250 & 300 mm |

|                    |                                     |
|--------------------|-------------------------------------|
| <b>Weld Plate:</b> |                                     |
| Size WP50:         | For impeller size 100 & 150 mm      |
| Size WP81:         | For impeller size 200, 250 & 300 mm |

|                                                                                                                       |                                                     |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| <b>Drive Unit:</b>                                                                                                    |                                                     |
| <b>Motor, IE4 (standard):</b>                                                                                         |                                                     |
| Integrated Permanent Magnet Synchron Motor (IPMSM) which has to be operated with a frequency inverter for IE4 motors. |                                                     |
| The frequency converter (not Alfa Laval supply) must be ordered for the voltage available at the place of operation.  |                                                     |
| Efficiency class:                                                                                                     | IE4                                                 |
| Enclosure / Motor protection:                                                                                         | IP66                                                |
| Configuration:                                                                                                        | Blue                                                |
| Nominal Power:                                                                                                        | 1.1 kW                                              |
| Nominal Voltage and frequency (from frequency converter):                                                             | Output 217 VAC, connected in delta, 70 Hz, 2100 RPM |
| Nominal Current:                                                                                                      | 3.59 A                                              |
| Configuration:                                                                                                        | Clean room, WP50                                    |
| Nominal Power:                                                                                                        | 0.75 kW                                             |
| Nominal Voltage and frequency (from frequency converter):                                                             | Output 199 VAC, connected in delta, 70 Hz, 2100 RPM |
| Nominal Current:                                                                                                      | 2.53 A                                              |
| Configuration:                                                                                                        | Clean room, WP81                                    |
| Nominal Power:                                                                                                        | 1.1 kW                                              |
| Nominal Voltage and frequency (from frequency converter):                                                             | Output 195 VAC, connected in delta, 70 Hz, 2100 RPM |
| Nominal Current:                                                                                                      | 3.61 A                                              |
| Country Code:                                                                                                         | All (one type covers all)                           |

|                                                           |                                           |
|-----------------------------------------------------------|-------------------------------------------|
| <b>Motor, option Premium/CUS:</b>                         |                                           |
| Efficiency class:                                         | Premium                                   |
| Enclosure / Motor Protection:                             | IP66                                      |
| Configuration:                                            | Blue, WP50                                |
| Nominal Power:                                            | 0.37 kW                                   |
| Nominal Voltage and frequency (from frequency converter): | Output 265 VAC, connected in delta, 60 Hz |
| Nominal Current:                                          | 1.40 A                                    |
| Configuration:                                            | Blue, WP81                                |
| Nominal Power:                                            | 0.75 kW                                   |
| Nominal Voltage and frequency (from frequency converter): | Output 265 VAC, connected in delta, 60 Hz |
| Nominal Current:                                          | 2.72 A                                    |
| Country Code:                                             | US/CA                                     |

|                                                           |                                           |
|-----------------------------------------------------------|-------------------------------------------|
| <b>Motor, option ATEX:</b>                                |                                           |
| Efficiency class:                                         | IE1 (WP50), IE2 (WP81)                    |
| Enclosure / Motor Protection:                             | IP66                                      |
| Safety class:                                             | II2G Ex de IIC T4                         |
| Configuration:                                            | Blue, WP50                                |
| Nominal Power:                                            | 0.25 kW                                   |
| Nominal Voltage and frequency (from frequency converter): | Output 230 VAC, connected in delta, 50 Hz |
| Nominal Current:                                          | 1.30 A                                    |
| Configuration:                                            | Blue, WP81                                |
| Nominal Power:                                            | 0.75 kW                                   |
| Nominal Voltage and frequency (from frequency converter): | Output 230 VAC, connected in delta, 50 Hz |
| Nominal Current:                                          | 2.94 A                                    |
| Country Code:                                             | EU + Not specific                         |

**Motor, option LV Explosion Proof Motor:**

|                                                           |                                               |
|-----------------------------------------------------------|-----------------------------------------------|
| Efficiency class:                                         | Premium                                       |
| Enclosure / Motor Protection:                             | IP66                                          |
| Safety class:                                             | Class1 Div1 Group D                           |
| Configuration:                                            | Blue, WP50                                    |
| Nominal Power:                                            | 0.37 kW                                       |
| Nominal Voltage and frequency (from frequency converter): | Output 208-230 VAC, connected in delta, 60 Hz |
| Nominal Current:                                          | 2.1 – 2.0 A                                   |
| Configuration:                                            | Blue, WP81                                    |
| Nominal Power:                                            | 1.1 kW                                        |
| Nominal Voltage and frequency (from frequency converter): | Output 230 VAC, connected in delta, 60 Hz     |
| Nominal Current:                                          | 4.4 A                                         |
| Country Code:                                             | US/CA                                         |

**Gear:**

|                                                    |                                                                                                    |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------|
| High efficiency helical bevel right angle gearbox. |                                                                                                    |
| Lubricant:                                         | Food compatible oil                                                                                |
| Maximum mounting angle acc. to horizontal:         | 0° - 45° (Different angle intervals based on configuration - Note: Motor may not point down wards) |
| Surface finish drive unit, standard:               | Painted Blue RAL 5010                                                                              |
| Surface finish drive unit, Clean Room option:      | Sealed Surface Conversion Treatment, Smooth Body (no fan)                                          |

**Console/flange:**

|                                                                    |                        |
|--------------------------------------------------------------------|------------------------|
| Standard height or option for extended height for insulated tanks. |                        |
| Attachment, Size WP50:                                             | Clamp connection       |
| Attachment, Size WP81                                              | Flange-bolt connection |

**PHYSICAL DATA****Materials:**

|                                        |                                                                        |
|----------------------------------------|------------------------------------------------------------------------|
| Impeller and Weld plate:               | AISI316L (UNS S31603)                                                  |
| Drive Rotor, shaft and console/flange: | AISI304 (UNS S30400)                                                   |
| Gear motor , Painted:                  | C2 according to DIN 12944 (NSF/ANSI 51-2009e)                          |
| Gear motor, Clean room:                | Permanent Bond Surface (nsd tupH) - compl. w. FDA Title 21 CFR 175.300 |
| Male Bearing:                          | Zirconia YTZP                                                          |
| Female bearing:                        | Silicium Carbide (EN 12756)                                            |
| Seals:                                 | FEP/FKM                                                                |
| Gearbox oil:                           | USDA H1                                                                |

**Temperatures:**

|                               |            |
|-------------------------------|------------|
| During product Mixing, media: | Max. 90°C  |
| During CIP (max. 50 RPM):     | Max. 95°C  |
| During SIP (max. 10 RPM):     | Max. 125°C |
| During SIP (max. 0 RPM):      | Max. 150°C |

**Max. speed:**

|                   |                   |
|-------------------|-------------------|
| Impeller size 100 | 800 RPM (81 Hz)   |
| Impeller size 150 | 480 RPM (48.5 Hz) |
| Impeller size 200 | 480 RPM (83 Hz)   |
| Impeller size 250 | 230 RPM (40 Hz)   |
| Impeller size 300 | 200 RPM (34.5 Hz) |

**Documentation:**

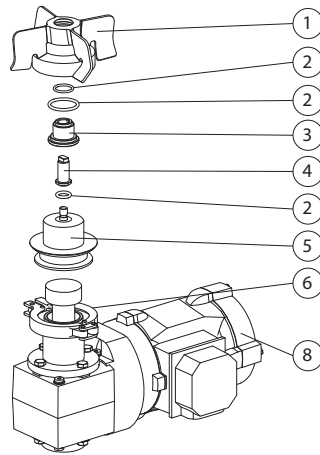
As standard with Q-Doc including:

- Compliance with Regulation (EC) No.: 1935/2004
- Compliance with (Ex/ATEX) directive 2014/34/EU (ATEX option, II -/2G Ex h IIC T4 -/Gb)
- Compliance to the EC Regulation for GMP
- 3.1 Material Certificates acc. to EN10204 (MTR) for all wetted parts
- Compliance to FDA CFR 21 (non-metallic parts) for elastomers, ceramics and gear oil.
- TSE (Transmissible Spongiform Encephalopathy) / ADI (Animal Derivative Ingredient) Declaration
- Surface finish compliance declaration

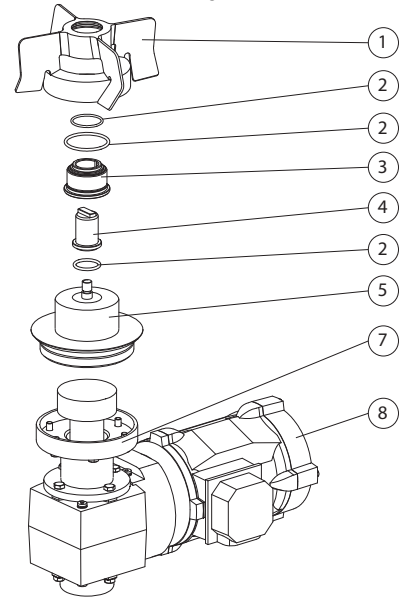
**Build up:**

1. Impeller
2. Seals
3. Female Bearing
4. Male Bearing
5. Weld Plate
6. Clamp ring connection (WP50 only)
7. Flange-Bolt Connection (WP81 only)
8. Drive unit

LeviMag WP50

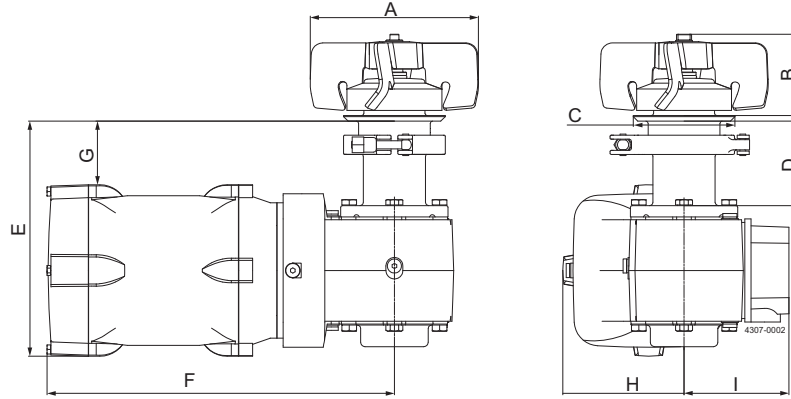


LeviMag WP81



Dimensions:  
LeviMag WP50

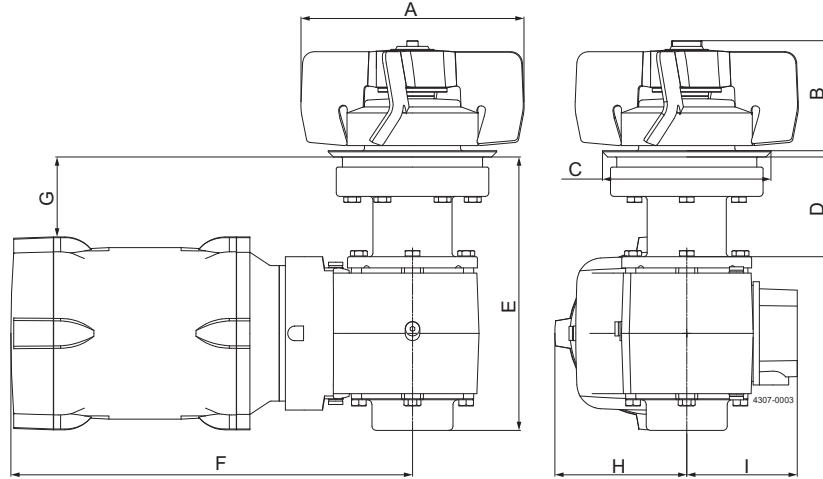
| Model         | Size WP50 - Ø100 impeller |                  |                  |                  | Size WP50 - Ø150 impeller |                  |                  |                  |
|---------------|---------------------------|------------------|------------------|------------------|---------------------------|------------------|------------------|------------------|
|               | Standard console          | Extended console | Standard console | Extended console | Standard console          | Extended console | Standard console | Extended console |
|               | Height + Painted          | Height + Painted | Height + Clean   | Height + Clean   | Height + Painted          | Height + Painted | Height + Clean   | Height + Clean   |
| Configuration | Gear Motor                | Gear Motor       | Room Gear Motor  | Room Gear Motor  | Gear Motor                | Gear Motor       | Room Gear Motor  | Room Gear Motor  |



|                      | Ø100 | Ø100 | Ø100 | Ø100 | Ø150 | Ø150 | Ø150 | Ø150 |
|----------------------|------|------|------|------|------|------|------|------|
| A                    | Ø100 | Ø100 | Ø100 | Ø100 | Ø150 | Ø150 | Ø150 | Ø150 |
| B                    | 72   | 72   | 72   | 72   | 72   | 72   | 72   | 72   |
| C                    | Ø90  | Ø90  | Ø90  | Ø90  | Ø90  | Ø90  | Ø90  | Ø90  |
| D                    | 75   | 125  | 75   | 125  | 75   | 125  | 75   | 125  |
| E IE4                | 215  | 265  | 209  | 259  | 215  | 265  | 209  | 259  |
| F IE4                | 340  | 340  | 308  | 308  | 340  | 340  | 308  | 308  |
| G IE4                | 50   | 100  | 57   | 107  | 50   | 100  | 57   | 107  |
| H IE4                | 114  | 114  | 108  | 108  | 114  | 114  | 108  | 108  |
| I IE4                | 111  | 111  | 93   | 93   | 111  | 111  | 93   | 93   |
| E Premium/CUS        | 202  | 252  | -    | -    | 202  | 525  | -    | -    |
| F Premium/CUS        | 318  | 318  | -    | -    | 318  | 318  | -    | -    |
| G Premium/CUS        | 63   | 113  | -    | -    | 63   | 113  | -    | -    |
| H Premium/CUS        | 105  | 105  | -    | -    | 105  | 105  | -    | -    |
| I Premium/CUS        | 94   | 94   | -    | -    | 94   | 94   | -    | -    |
| E ATEX               | 202  | 252  | -    | -    | 202  | 252  | -    | -    |
| F ATEX               | 373  | 373  | -    | -    | 373  | 373  | -    | -    |
| G ATEX               | 62   | 112  | -    | -    | 62   | 112  | -    | -    |
| H ATEX               | 105  | 105  | -    | -    | 105  | 105  | -    | -    |
| I ATEX               | 119  | 119  | -    | -    | 119  | 119  | -    | -    |
| E LV Explosion Proof | 223  | 273  | -    | -    | 223  | 273  | -    | -    |
| F LV Explosion Proof | 520  | 520  | -    | -    | 520  | 520  | -    | -    |
| G LV Explosion Proof | 45   | 95   | -    | -    | 45   | 95   | -    | -    |
| H LV Explosion Proof | 123  | 123  | -    | -    | 123  | 123  | -    | -    |
| I LV Explosion Proof | 142  | 142  | -    | -    | 142  | 142  | -    | -    |

LeviMag WP81

| Model         | Size WP81 - Ø200 impeller |                    |                       |                       | Size WP81 - Ø250 impeller |                    |                       |                       | Size WP81 - Ø300 impeller |                    |                       |                       |
|---------------|---------------------------|--------------------|-----------------------|-----------------------|---------------------------|--------------------|-----------------------|-----------------------|---------------------------|--------------------|-----------------------|-----------------------|
|               | Standard                  | Extended           | Standard              | Extended              | Standard                  | Extended           | Standard              | Extended              | Standard                  | Extended           | Standard              | Extended              |
|               | console                   | console            | console               | console               | console                   | console            | console               | console               | console                   | console            | console               | console               |
|               | Height +                  | Height +           | Height +              | Height +              | Height +                  | Height +           | Height +              | Height +              | Height +                  | Height +           | Height +              | Height +              |
| Configuration | Painted Gear Motor        | Painted Gear Motor | Clean Room Gear Motor | Clean Room Gear Motor | Painted Gear Motor        | Painted Gear Motor | Clean Room Gear Motor | Clean Room Gear Motor | Painted Gear Motor        | Painted Gear Motor | Clean Room Gear Motor | Clean Room Gear Motor |



|                      | Ø200 | Ø200 | Ø200 | Ø200 | Ø250 | Ø250 | Ø250 | Ø250 | Ø300 | Ø300 | Ø300 | Ø300 |
|----------------------|------|------|------|------|------|------|------|------|------|------|------|------|
| A                    | Ø200 | Ø200 | Ø200 | Ø200 | Ø250 | Ø250 | Ø250 | Ø250 | Ø300 | Ø300 | Ø300 | Ø300 |
| B                    | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   | 98   |
| C                    | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 | Ø149 |
| D                    | 89   | 139  | 89   | 139  | 89   | 139  | 89   | 139  | 89   | 139  | 89   | 139  |
| E IE4                | 243  | 293  | 243  | 293  | 243  | 293  | 243  | 293  | 243  | 293  | 243  | 293  |
| F IE4                | 354  | 354  | 357  | 357  | 354  | 354  | 357  | 357  | 354  | 354  | 357  | 357  |
| G IE4                | 74   | 124  | 70   | 120  | 74   | 124  | 70   | 120  | 74   | 124  | 70   | 120  |
| H IE4                | 114  | 114  | 117  | 117  | 114  | 114  | 117  | 117  | 114  | 114  | 117  | 117  |
| I IE4                | 111  | 111  | 98   | 98   | 111  | 111  | 98   | 98   | 111  | 111  | 98   | 98   |
| E Premium/CUS        | 243  | 293  | -    | -    | 243  | 293  | -    | -    | 243  | 293  | -    | -    |
| F Premium/CUS        | 354  | 354  | -    | -    | 354  | 354  | -    | -    | 354  | 354  | -    | -    |
| G Premium/CUS        | 78   | 128  | -    | -    | 78   | 128  | -    | -    | 78   | 128  | -    | -    |
| H Premium/CUS        | 110  | 110  | -    | -    | 110  | 110  | -    | -    | 110  | 110  | -    | -    |
| I Premium/CUS        | 112  | 112  | -    | -    | 112  | 112  | -    | -    | 112  | 112  | -    | -    |
| E ATEX               | 294  | 344  | -    | -    | 294  | 344  | -    | -    | 294  | 344  | -    | -    |
| F ATEX               | 418  | 418  | -    | -    | 418  | 418  | -    | -    | 418  | 418  | -    | -    |
| G ATEX               | 77   | 127  | -    | -    | 77   | 127  | -    | -    | 77   | 127  | -    | -    |
| H ATEX               | 110  | 110  | -    | -    | 110  | 110  | -    | -    | 110  | 110  | -    | -    |
| I ATEX               | 144  | 144  | -    | -    | 144  | 144  | -    | -    | 144  | 144  | -    | -    |
| E LV Explosion Proof | 248  | 298  | -    | -    | 248  | 298  | -    | -    | 248  | 298  | -    | -    |
| F LV Explosion Proof | 534  | 534  | -    | -    | 534  | 534  | -    | -    | 534  | 534  | -    | -    |
| G LV Explosion Proof | 69   | 119  | -    | -    | 69   | 119  | -    | -    | 69   | 119  | -    | -    |
| H LV Explosion Proof | 123  | 123  | -    | -    | 123  | 123  | -    | -    | 123  | 123  | -    | -    |
| I LV Explosion Proof | 142  | 142  | -    | -    | 142  | 142  | -    | -    | 142  | 142  | -    | -    |

**Machine Selection:**

LeviMag can be sized and configured in Alfa Laval configurator.  
 Selection of size can also be done by use of the below selection charts.  
 Needed information for selection of size:

- Media Viscosity
- Tank Volume
- Tank diameter and tank bottom shape.
- Duty (see below Duty Levels)

| Duty Level | Duty                  | Description                                                                                                                                                    |
|------------|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1          | Keep media homogenous | Keeping fluids homogenous & low gradient heat transfer                                                                                                         |
| 2          | Mild blending         | Simple blending of miscible fluids & high gradient heat transfer, no specific request to mixing time, create suspension if deposit velocity is below 0.015 m/s |
| 3          | Mixing                | Mixing of fluids, relative low mixing time, create suspension if deposit velocity is below 0.03 m/s                                                            |
| 4          | Powerful mixing       | Dissolving solids, very low mixing time, create suspension if deposit velocity is below 0.06 m/s.                                                              |

**Preconditions for using the selection charts:**

- Liquid height must be equal to or lower than 2½ times the tank diameter
- Specific gravity of the media must be less than or equal to 1.1
- if duty involves suspension of particles (see deposit velocity limits in the duty levels), the tank diameter D must be:

$$D \leq \sqrt[3]{\frac{V * 4}{\pi}}$$

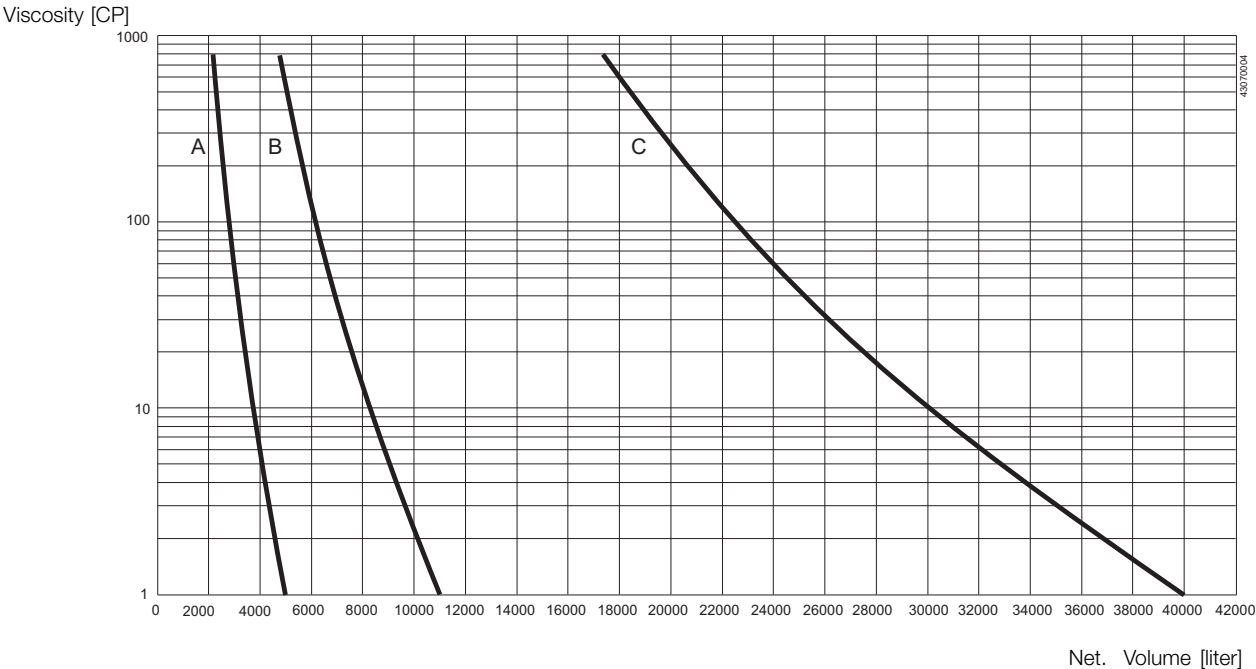
where V is the net. Volume.

- If preconditions are not fulfilled please contact Alfa Laval Global Technical Support

**How to select:**

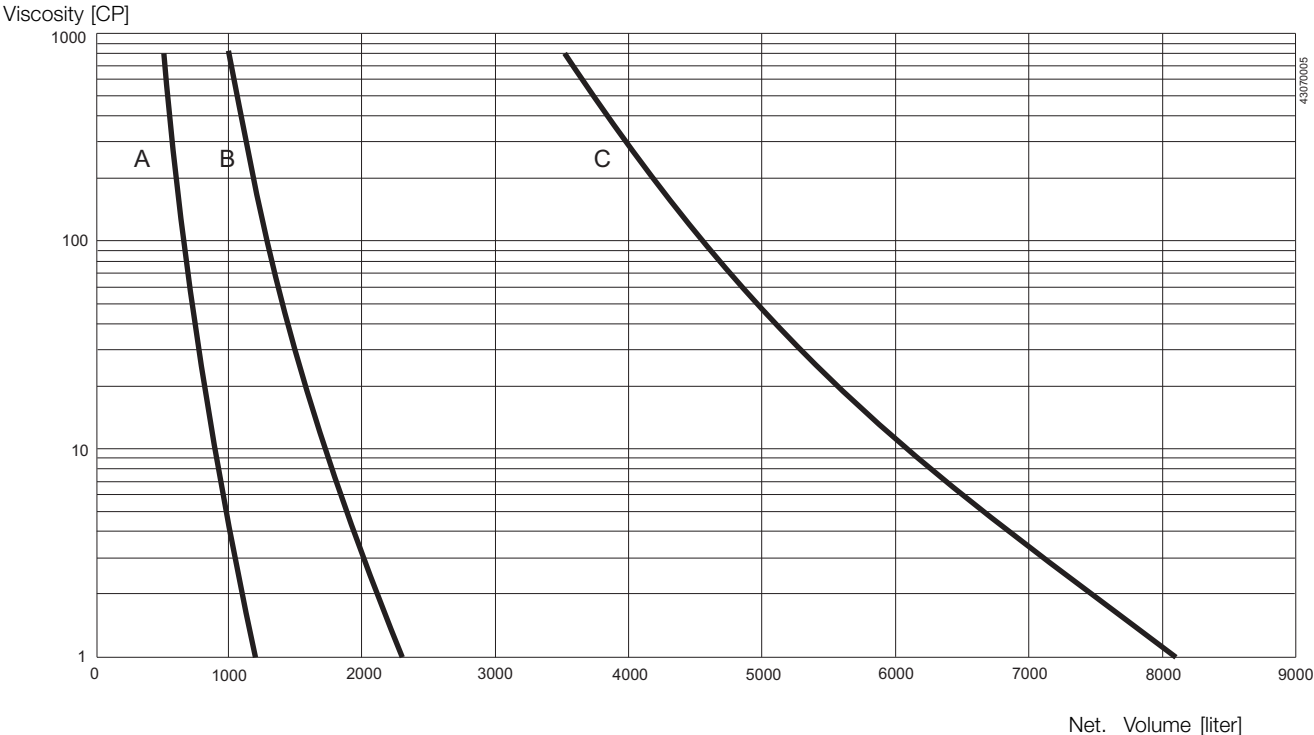
1. Select duty
2. Check preconditions
3. Go to the chart for the chosen duty
4. Read out the point for the requested tank volume (X-axis) and viscosity (Y-axis)
5. Choose the curve to the right from the point
6. If physically possible a larger impeller size can always be chosen - eg. to obtain a gentler product treatment (operating at lower speed)

Duty Level 1: Keep media homogenous  
Volume vs. viscosity



- A: LeviMag size 100 mm
- B: LeviMag size 150 mm
- C: LeviMag size 200, 250 and 300 mm

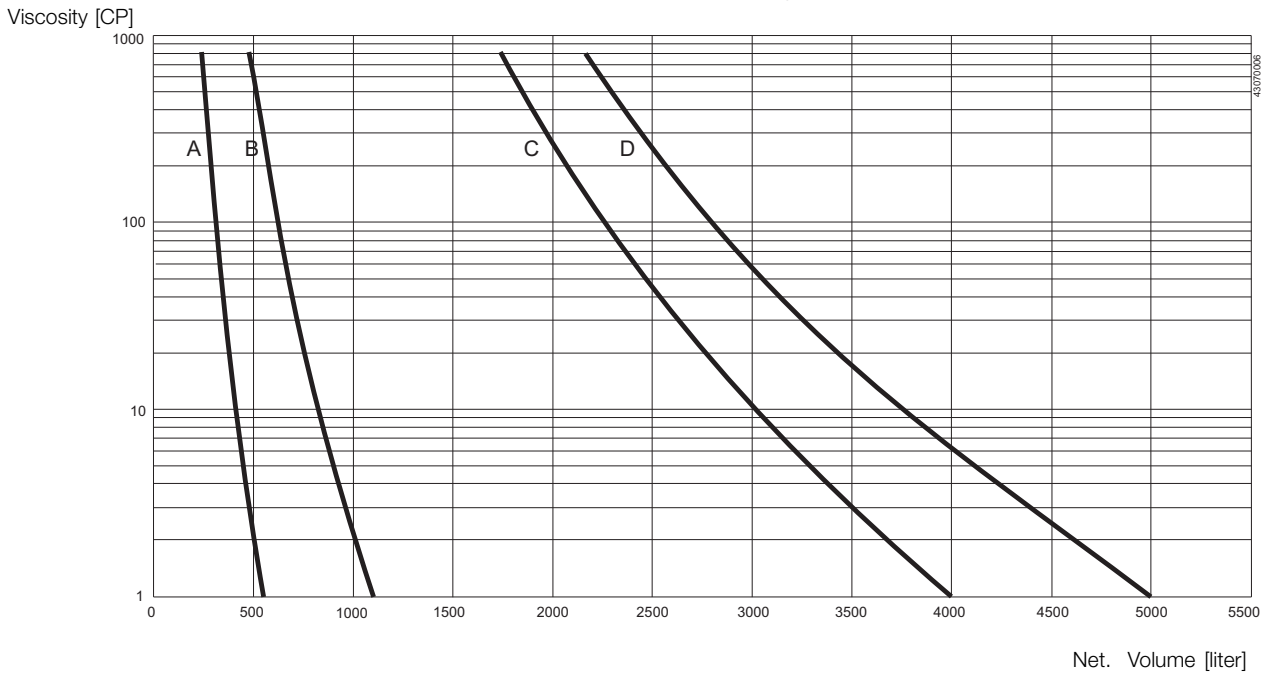
Duty Level 2: Mild blending  
Volume vs. viscosity



- A: LeviMag size 100 mm
- B: LeviMag size 150 mm
- C: LeviMag size 200, 250 and 300 mm

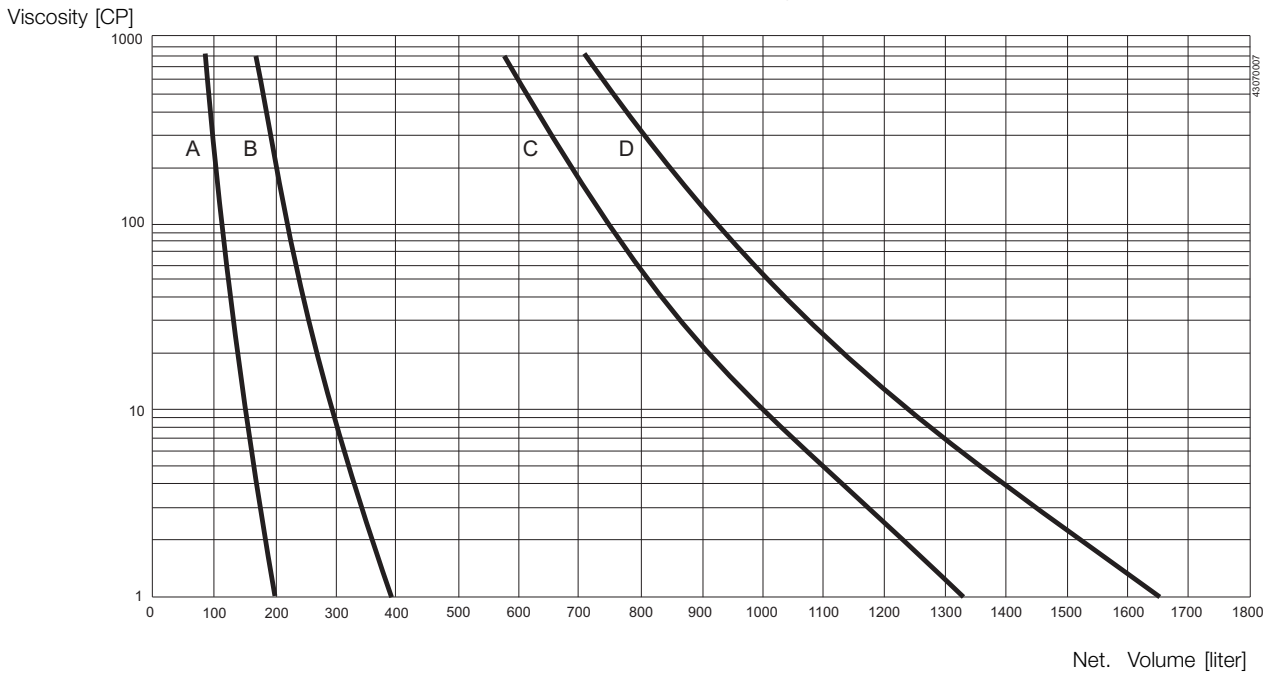


Duty Level 3: Mixing  
Volume vs. viscosity



- A: LeviMag size 100 mm
- B: LeviMag size 150 mm
- C: LeviMag size 200, 250 mm
- D: LeviMag size 300 mm

Duty Level 4: Powerfull mixing  
Volume vs. viscosity



- A: LeviMag size 100 mm
- B: LeviMag size 150 mm
- C: LeviMag size 200, 250 mm
- D: LeviMag size 300 mm



Alfa Laval reserves the right to change specifications without prior notification.

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**How to contact Alfa Laval**

Contact details for all countries are continually updated on our website. Please visit [www.alfalaval.com](http://www.alfalaval.com) to access the information direct.